Ontario. Cottage Pollution Control Program.

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1970 Cottage Pollution Control Program : Kushog Lake.

Ont. Govt. P.

O.W.R.C. Cottage Pollution Control

ONTARIO WATER RESOURCES COMMISSION

1970 COTTAGE POLLUTION CONTROL PROGRAM

KUSHOG LAKE

As a result of recommendations contained in the March, 1970, report on Environmental Management of Recreational Waters in Cottage Areas in Ontario, staff of the Ontario Water Resources Commission's District Engineers Branch conducted two field surveys of Kushog Lake located in the County of Haliburton. The first water quality survey occurred during the period of June 13 to 17, 1970, prior to the height of the summer recreational season, while the August 12 to 16, 1970, survey was conducted while summer recreational activity was at a maximum.

The bacteriological results, which were evaluated statistically by the OWRC's Bacteriological Branch, and the location of the sampling points are shown on the appended maps. Many stations are represented by a single value for each of the three bacteriological indicator organisms tested; this was possible since, according to the statistical evaluation, the bacterial densities at many of the stations were not significantly different from one another. Therefore, the bacterial densities at most stations were as follows:

Geometric Mean Density	Survey Period	
	June 13-17	August 12-16
Total Coliform Organisms per 100 ml	155	319
Fecal Coliform Organisms per 100 ml	3	6
Fecal Streptococcus Organisms per 100 ml	2	4

According to the results, the water met the OWRC bacteriological

criteria for total body contact recreational use during both survey periods. The only exception was the high fecal streptococcus level at Station 1 during the first survey; however, this is attributed to localized natural animal pollution.

During the first survey, higher nutrient concentrations were found in the vicinity of the lake inflows from Margaret Creek and St. Nora Lake. Meteorological conditions apparently caused an increase in the concentrations of some nutrients on June 17. The water was low in mineral content, with the hardness being 14 ppm during the second survey.

Thermal stratification, a natural occurrence in many lakes, was observed during the summer survey in most of the lake. The dissolved oxygen content in the waters below the thermocline (zone of rapid temperature change) in the southern half of the lake was below that designated by the OWRC for the preservation of biological life. In the northern deeper half, insufficient oxygen existed in the bottom 20 feet only. The aforementioned low dissolved oxygen concentrations are attributed primarily to the decomposition of organic matter on the lake bottom.

BACTERIOLOGICAL INDICATOR ORGANISMS

TOTAL COLIFORM organisms include a wide variety of bacteria ranging from the genus (group) Escherischia Coli (E. coli), which originate mainly in the intestines of man and other warm blooded animals, to the genera Citrobacter and Enterobacter aerogenes. The latter genera are basically found in soil but are also present in feces in small numbers. The presence of total coliforms in water may indicate soil run-off or, more important, less recent fecal pollution since organisms of the Enterobacter - Citrobacter groups tend to survive longer in water than do members of the Escherischia Coli group, and even to multiply when suitable environmental conditions exist.

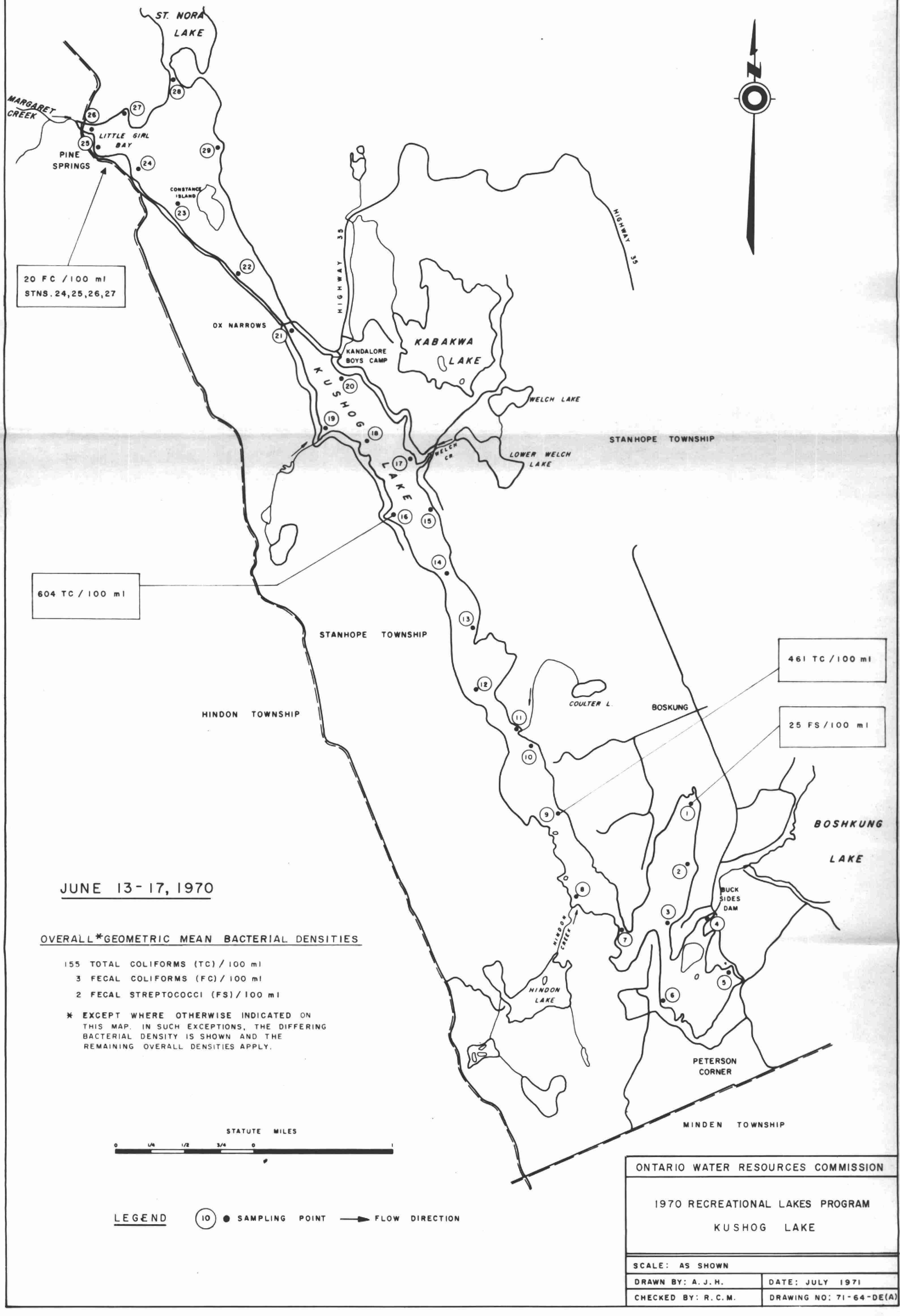
The FECAL COLIFORM organisms are those coliform bacteria which are of intestinal origin and, therefore, are an indicator of recent fecal pollution. Most of the coliform bacteria found by the fecal coliform test are of the genus Escherichia Coli.

FECAL STREPTOCOCCI organisms are normal inhabitants of the large intestine of man and animals and generally do not multiply outside the human body. In waters polluted with fecal material, fecal streptococci are usually found along with fecal coliform bacteria but in smaller numbers. When the number of fecal streptococci bacteria approximates or is greater than the number of fecal coliform organisms, animals are the probable source.

The OWRC Guidelines and Criteria for Water Quality Management in Ontario (1970) indicate that water used for total body contact recreation can be considered impaired when the total coliform, fecal coliform, and/or fecal streptococcus geometric mean density exceeds 1000,100, and/or 20 per 100 ml, respectively.

NOTE: The term "geometric mean" refers to a type of average. Mathematically speaking, the geometric mean of a set of N numbers is the Nth root of the product of the numbers; in practice, it is computed by the use of logarithms.

KUSHOG LAKE



JUNE 13 - 17, 1970

OVERALL*GEOMETRIC MEAN BACTERIAL DENSITIES

155 TOTAL COLIFORMS (TC) / 100 ml
3 FECAL COLIFORMS (FC) / 100 ml
2 FECAL STREPTOCOCCI (FS) / 100 ml

* EXCEPT WHERE OTHERWISE INDICATED ON THIS MAP. IN SUCH EXCEPTIONS, THE DIFFERING BACTERIAL DENSITY IS SHOWN AND THE REMAINING OVERALL DENSITIES APPLY.

STATUTE MILES

0 1/4 1/2 3/4 0 1

LEGEND (10) ● SAMPLING POINT → FLOW DIRECTION

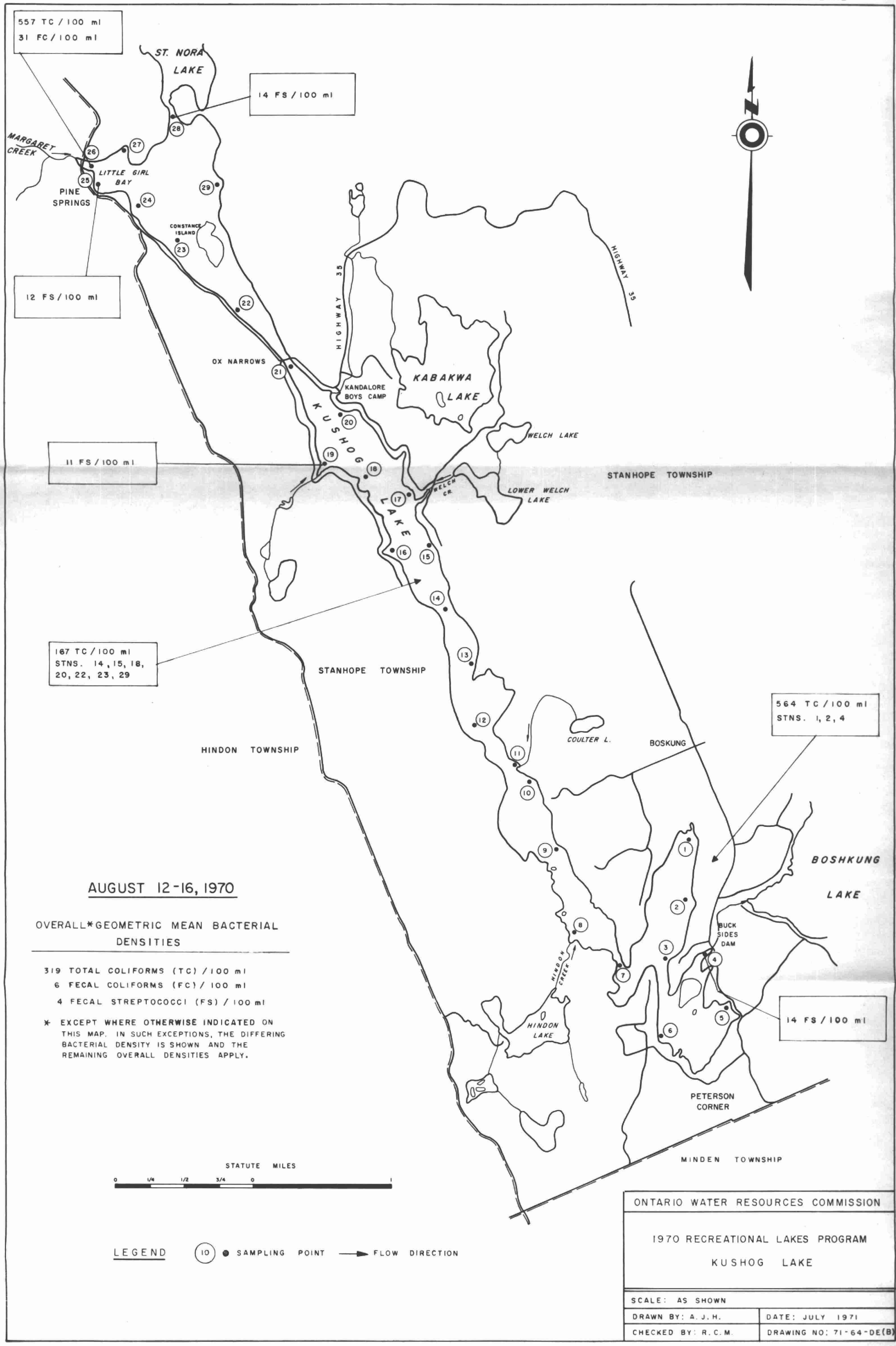
ONTARIO WATER RESOURCES COMMISSION

1970 RECREATIONAL LAKES PROGRAM

KUSHOG LAKE

SCALE: AS SHOWN	
DRAWN BY: A. J. H.	DATE: JULY 1971
CHECKED BY: R. C. M.	DRAWING NO: 71-64-DE(A)

KUSHOG LAKE



AUGUST 12-16, 1970

OVERALL*GEOMETRIC MEAN BACTERIAL DENSITIES

319 TOTAL COLIFORMS (TC) / 100 ml
6 FECAL COLIFORMS (FC) / 100 ml
4 FECAL STREPTOCOCCI (FS) / 100 ml

* EXCEPT WHERE OTHERWISE INDICATED ON THIS MAP. IN SUCH EXCEPTIONS, THE DIFFERING BACTERIAL DENSITY IS SHOWN AND THE REMAINING OVERALL DENSITIES APPLY.

STATUTE MILES

0 1/4 1/2 3/4 0 1

LEGEND (10) ● SAMPLING POINT → FLOW DIRECTION

ONTARIO WATER RESOURCES COMMISSION

1970 RECREATIONAL LAKES PROGRAM

KUSHOG LAKE

SCALE: AS SHOWN	
DRAWN BY: A. J. H.	DATE: JULY 1971
CHECKED BY: R. C. M.	DRAWING NO: 71-64-DE(B)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